APPENDIX A: INTEGRATED REPORT TABLES

Table 1: Summary of use support – assessed and reported.

Designated Beneficial Use	Total Size	Size Assessed	Size Fully Supporting	Size Not Supporting	Size Not Attainable
		Rivers (Miles))		
Full Body Contact (Recreational Use)	42,411	20,804	4,776	16,027	0
Human Health and Wildlife (Fishable Use)	42,331	5,866	1,213	4,653	0
Public Water Supply ¹	117	1	0	1	0
Warm Water Aquatic Life (Aquatic Life Use)	42,320	24,232	17,461	6,771	31
	Lake M	ichigan Shoreli	ne (Miles)		
Full Body Contact (Recreational Use)	67	67	5	62	0
Human Health and Wildlife (Fishable Use)	67	67	0	67	0
Public Water Supply	35	35	35	0	0
Warm Water Aquatic Life (Aquatic Life Use)	67	67	62	5	0
	La	ke Michigan (A	cres)		
Human Health and Wildlife (Fishable Use)	154,176	154,176	0	154,176	0
	Lakes	and Reservoirs	s (Acres)		
Full Body Contact (Recreational Use)	122,303	31,805	26%	23,799	8,006
Human Health and Wildlife (Fishable Use)	122,303	66,247	54%	7,820	58,427
Public Water Supply	29,541	16,615	56%	230	16,385
Warm Water Aquatic Life (Aquatic Life Use)	122,303	10,315	8%	3,690	6,625

Source: IDEM's assessment database

1While all waterbodies in Indiana are designated for aquatic life and recreational uses, not all are designated for drinking water use. There are a total of 29,541 lake acres and 111 stream miles (including 35 miles of shoreline) designated for drinking water in Indiana.

Table 2: Atlas information.

Description	Value	Units
Indiana population ¹	6,080,485	-
Indiana surface area ²	36,291	square miles
Total miles of rivers and streams ³	40,168	miles
Number of publicly-owned lakes/ reservoirs/ ponds ⁴	575+	-
Publicly-owned lakes/ reservoirs/ ponds ⁴	106,205	acres
Great Lakes ⁴	154,176	acres
Great Lakes shoreline ⁵	67	miles
Fresh water wetlands ⁶	813,000	acres

Sources: ¹U.S. Census Bureau ²State Information Center ³Horizon Systems Corporation 1994 ⁴U.S. EPA 1993 ⁵Indiana Reach Index ⁶Rolley 1991

Table 3: SRF investments in SFY 2010 and 2011.

SRF program	Number of projects	Loan amount	Savings realized
Clean Water	83	\$504,263,018	\$296,282,558
Drinking Water	48	\$119,226,546	\$75,475,205

Source: SRF tracking database

Table 4: 205(j) and 319(h) Investments in SFY 2003-2011. Table does not include an additional \$434,328 from the American Recovery and Reinvestment Act of 2009, which was awarded through the SRF Program.

205(j)			319(h)		
FFY	Number of Projects	Amount Awarded	FFY	Number of Projects	Amount Awarded
2003	6	\$507,054	2003*	34	\$4,544,480
2004	6	\$497,220	2004**	27	\$4,159,332
2005	3	\$254,430	2005***	21	\$3,747,145
2006	2	\$251,310	2006	18	\$3,374,538
2007	2	\$148,915	2007	12	\$3,022,961
2008	0	0	2008	8	\$2,967,181
2009	2	\$271,432	2009	9	\$2,759,609
2010	2	\$293,753	2010	11	\$3,653,209
2011	4	\$699,775	2011	8	\$2,457,215

^{*} includes 2 in-house projects totaling \$526,122

Table 5: Summary of changes in water quality in the Bull Run/West Creek watershed.

Stream Name	Sample Number	Location	Previous IBI Score	2011 IBI Score
West Creek	UMK140-0009	Homestead Park	IBI=16	Improved IBI=36
Bull Run	UMK140-0016	101st Ave.	IBI=24	Improved IBI=38
Bull Run	UMK140-0017	Ol Cott Ave.	IBI=20	Improved IBI=38
West Creek	UMK140-0021	109th Ave.	IBI=24	Improved IBI=36
West Creek	UMK140-0024	125th Ave.	IBI=32	Improved IBI=36
Bull Run	UMK140-0007	101st Ave.	IBI=0 (no fish)	Improved IBI=44

^{**} includes 2 in-house projects totaling \$248,792

^{***} includes 1 in-house project totaling \$155,686

Table 6: OWQ's primary water quality monitoring objectives and the types of monitoring approaches needed to meet them.

Key	Monitoring Objective	Probabilistic	Targeted	Priority Rationale
A	Conduct water quality assessments pursuant to CWA Section 305(b) to support the development of Indiana's Integrated Report to U.S. EPA	X	X	Required for CWA Section 106 funding to meet CWA goals
В	Development of Indiana's CWA Section 303(d) List of Impaired Waters for Indiana's Integrated Report	X	X	Required for CWA Section 106 funding to meet CWA goals
С	Develop Total Maximum Daily Loads to address impairments identified on Indiana's 303(d) list	X	X	Required for CWA Section 106 funding to meet CWA goals
D	Determine trends and trophic status of Indiana's lakes and reservoirs under CWA Section 314		X	Required for CWA Section 106 funding to meet CWA goals
Е	Develop water quality criteria, including nutrient criteria for lakes and reservoirs, rivers and streams	X	X	Required for CWA Section 106 funding to meet CWA goals
F	Support watershed planning and restoration efforts	X	X	Required for to CWA Section 319 funding and to meet performance measures in U.S. EPA's Strategic Plan
G	Identify water quality improvements accomplished by watershed restoration efforts funded through CWA programs		X	Required to meet performance measures in U.S. EPA's Strategic Plan
Н	Support the development of public health advisories related to the use of Indiana's water resources, including fish consumption advisories and recreational use advisories		X	Supports protection of human health
I	Determine ambient ground water quality and extent of contaminated areas		X	Supports protection of human health

Key	Monitoring Objective	Probabilistic	Targeted	Priority Rationale
J	Support source water protection including both ground water and surface source water supplies		X	Supports protection of human health
K	Support development of National Pollutant Discharge Elimination System permit limits	X	X	Required for CWA Section 106 funding to meet CWA goals
L	Develop environmental indicators, including indices of biological integrity, for use in making water quality assessments	X		Supports primary monitoring objectives (A-C, E)
М	Responding to citizen complaints about activities that may be impacting private wells		X	Mandated by State Statute

Modified from IDEM OWQ's Surface Water Monitoring Strategy, 2011-2019

Table 7: Reduction of sediment, phosphorus, and nitrogen reaching Indiana waters.

Dates	Sediment Reduction (ton/year)	Phosphorus Reduction (lbs/year)	Nitrogen Reduction (lbs/year)
2000-2003	35,870	42,662	85,710
2004	18,561	21,993	44,527
2005	33,415	39,347	79,349
2006	25,831	40,538	99,434
2007	23,279	126,529	125,848
2008	18,119	25,400	65,367
2009	7,965	15,479	15,319
2010	33,420	31,374	66,400
2011	370,508	104,061	121,361

Source: IDEM OWQ nonpoint source project tracking database

Table 8: External data sets received in response to IDEM's 305(b)/303(d) solicitations in 2007 and 2009.

Source
American Water Company
Ancilla College
City of Anderson
City of Angola and Trine University
City of Decatur
City of Elkhart
City of Indianapolis
City of Kokomo
City of Lafayette
City of Peru
City of Richmond
City of Seymour
City of Shelbyville
City of South Bend
City of Valparaiso
City of Elkhart
Emily Tallo and Save Maumee Grassroots Organization
Hamilton County Health Department
Howard County Health Department
Johnson County Health Department
Madison County MS4
Marion County Health Department
Michigan City
Monroe County Parks and Recreation
City of Muncie
Sarah Skelton and Lake of the Woods Property Owner's Association
St. Joseph Watershed and The Nature Conservancy
Steuben County Lakes Council

Source
Town of Brownsburg
Town of Fortville
Town of McCordsville
Town of Speedway
White County Department of Health

Table 9: External data sets determined by IDEM to meet the necessary data quality requirements for 305(b) assessment and 303(d) listing purposes.

Source	Type of Assessment
American Water Company	Drinking water use support
City of Elkhart	Aquatic life use support; Fishable use support
City of Indianapolis	Recreational use support; Drinking water use support; Aquatic life use support
City of Muncie	Recreational use support; Drinking water use support; Aquatic life use support
City of South Bend	Recreational use support
City of Valparaiso	Recreational use support; Drinking water use support; Aquatic life use support
Marion County Health Department	Recreational use support; Drinking water use support; Aquatic life use support

Table 10: Summary of water quality assessment methodology for determining designated use support.

Aquatic Life Use Support - Rivers and Streams					
	Dissolved metals, pesticides, polyaromatic hydrocarbons (PAH), free cyanide, ammonia were evaluated on a site-by-site basis and judged according to the magnitude of the exceedance(s) of Indiana's WQS and the number of times the exceedance(s) occurred. For any one pollutant (grab or composite samples), the following assessment criteria are applied to data sets consisting of three or more measurements.				
Toxicants	Fully Supporting	Not Supporting			
	≤1 exceedance of the acute criteria within a three-year period, and ≤1 exceedance of the chronic criteria for aquatic life within a three-year period.	>1 exceedance of the acute or chronic criteria for aquatic life within a three-year period.			
	Dissolved oxygen, pH, sulfates, chlorides were evaluated for the exceedance(s) of Indiana's WQS. For any one pollutant, the following assessment criteria are applied sets consisting of three or more measurements.				
	Fully Supporting	Not Supporting			
Conventional inorganics	For dissolved oxygen, one or more samples may be <4mg/L, but no more than 10% of all measurements are <5mg/L. For other conventional inorganics, criteria are exceeded in <10% of measurements.	For dissolved oxygen, one or more samples <4mg/L and more than 10% of all measurements are <5mg/L. For other conventional inorganics, criteria are exceeded in >10% of measurements.			
Nutrients	 Nutrient conditions were evaluated on a site-by-site basis using the benchmarks described below. In most cases, two or more of these conditions must be met on the same date in order to classify a waterbody as impaired. This methodology assumes a minimum of three sampling events. Total Phosphorus: One or more measurements >0.3 mg/l Nitrogen (measured as NO₃ + NO₂) – One or more measurements >10.0 mg/l Dissolved Oxygen (DO) – Measurements below the water quality standard of 4.0 mg/l or measurements that are consistently at/close to the standard, the range of 4.0-5.0 mg/l or values >12.0 mg/l pH measurements – Measurements above the water quality standard of 9.0 or measurements that are consistently at/close to the standard, in the range of 8.7-9.0 Algal Conditions – Algae are described as "excessive" based on field observations by IDEM scientists. 				

Benthic aquatic	Fully Supporting	Not Supporting	
macroinvertebrate Index of Biotic Integrity (mIBI) Scores (Range of possible scores is 12-60)	mIBI >36	mIBI <36	
Fish community (IBI) Scores (Range of possible scores is 6-60)	IBI ≥36	IBI <36	
Qualitative habitat use evaluation (QHEI) (Range of possible scores is 0-100)	The Qualitative Habitat Evaluation Index (QHEI) is not used to determine aquatic life use support. Rather, the QHEI is an index designed to evaluate the lotic habitat quality important to aquatic communities and is used in conjunction with mIBI or IBI data, or both to evaluate the role that habitat plays in waterbodies where impaired biotic communities (IBC) have been identified. QHEI scores are calculated using six metrics: substrate, instream cover, channel morphology, riparian zone, pool/riffle quality, and gradient. A higher QHEI score represents a more diverse habitat for colonization of aquatic organisms. IDEM has determined that a QHEI total score of <51 indicates poor habitat. For streams where the macroinvertebrate community (mIBI or mHab) or fish community (IBI) scores indicate IBC, QHEI scores are evaluated to determine if habitat is the primary stressor on the aquatic communities or if there may be other stressors/pollutants causing the IBC.		
	Aquatic Life Use Support – Lakes and	l Reservoirs	
	Fully Supporting Not Supporting		
Indiana Department of Natural Resources surveys of the status of sport fish communities in lakes and information on trout stocking.	Supports cold water fishery, including native Cisco and stocked trout, or both.	Native Cisco population is gone or lake unable to support stocked trout and lake attributes, or both, appear to contribute to warm water fishery condition.	
Temperature and pH	Lakes in which thermal modifications have caused an adverse effect on aquatic life and lakes that do not meet Indiana's WQS for pH have been assessed as not supporting of aquatic life use.		

Fish Consumption Use Support (Human Health)

All samples from a given sampling reach must have results below the benchmarks for mercury and polychlorinated biphenyls (PCBs) in order to be assessed as fully supporting, and all waters with a sample result exceeding the benchmark for either mercury or PCBs, or both are classified as impaired.

	Fully Supporting	Not Supporting	
Mercury in Fish Tissue	Actual concentration values (including estimated values above the method detection limits) for all samples collected from	One or more actual concentration values (including estimated values above the method detection limits) for samples collected from sampling reach are >0.3 mg/kg	
	Fully Supporting	Not Supporting	
PCBs in Fish Tissue	Actual concentration values (including	One or more actual concentration values (including estimated values above the method detection limits) for samples collected from sampling reach are >0.02 mg/kg	

Recreational Use Support (Human Health) – All waters

IDEM has two different criteria for recreational use assessments depending on the type of data set being used in making the assessment. For data sets consisting of five equally spaced samples over a 30-day period, we apply two tests, both of which are based on U.S. EPAs Ambient Water Quality Criteria for Bacteria - 1986 (EPA440/5-84-002), which provides the foundation for Indiana's WQS for recreational use. For data sets consisting of 10 or more grab samples where no five of which are equally spaced over a 30-day period, the 10% rule is applied. Specific criteria are provided below.

Fully Supporting		Not Supporting	
Bacteria (<i>E. coli</i>): at least five equally spaced samples over 30 days. (cfu = colony forming units)	Geometric mean does not exceed 125 cfu/100ml and no more than one sample >576 cfu/100ml.	Geometric mean exceeds 125 cfu/100mL.	
Bacteria (<i>E. coli</i>): grab samples (cfu = colony forming units)		More than 10% of samples >576 cfu/100ml or more than one sample >2,400 cfu/100ml.	

Drinking Water Use Support – Rivers and Streams				
Rivers are designated for drinking water uses if a community water supply has a drinking water intake somewhere along the segment. When IDEM has data for a segment with a drinking water intake, those data are compared to the applicable ambient water quality criteria in Indiana's WQS to determine if the drinking water use is met. The appropriate water quality criteria are applied for specific substances identified in the WQS. Information regarding non-naturally occurring taste and odor producing substances not specifically identified in the WQS are reviewed within the context of a water treatment facility's ability to meet Indiana's drinking WQS using conventional treatment.				
Toxicants Dissolved metals, pesticides, PCBs, free cyanide were evaluated on a site by site basis and judged according to magnitude of the exceedance(s) of Indiana's WQS for point of water intake and the number of times exceedance(s) occurred. For any one pollutant (grab or composite samples), the following assessment criteria are applied.				
	Fully Supporting Not Supporting			
	No more than one exceedance of the acute or chronic criteria for human health within a three-year period.	More than one exceedance of the acute or chronic criteria for human health within a three-year period.		
Conventional inorganics	Total dissolved solids, specific conductance, sulfate, chloride, nitrite-N and nitrogen (measured as NO ₃ + NO ₂) were evaluated for the exceedance(s) of Indiana's WQS for point of water intake and the number of times the exceedance(s) occurred. For any single pollutant (grab or composite samples), the following assessment criteria are applied to data sets consisting of three or more measurements.			
conventional morganics	Fully Supporting	Not Supporting		
	No more than one exceedance of the acute or chronic criteria for human health within a three-year period.	More than one exceedance of the acute or chronic criteria for human health within a three-year period.		
	Fully Supporting	Not Supporting		
Taste and odor producing substances	Taste and odor substances not present in quantities sufficient to interfere with production of drinking water by	Taste and odor substances present in quantities requiring additional treatment by the public water supply to prevent		

taste and odor problems

conventional treatment

Recreational Use Support (Aesthetics) – Lakes and Reservoirs			
	Fully Supporting	Not Supporting	
	No more than 10% of all TP values >54 ug/L and their associated Chla values are <20ug/L	Less than 10% of all TP values are >54 ug/L but their associated Chla values are >20ug/L, and the TSI score for the lake indicates eutrophic (32-46) or hypereutrophic (>47) conditions	
NI-to-o-1 I also		Or	
Natural Lakes		More than 10% of all TP values are >54 ug/L with associated Chla values <4ug/L, but the TSI score for the lake indicates eutrophic (32-46) or hypereutrophic (>47) conditions	
		Or	
		More than 10% of all TP values are >54 ug/L with associated Chla values >4ug/L	
	Fully Supporting	Not Supporting	
	No more than 10% of all TP values >51 ug/L and their associated Chla values are <25ug/L	Less than 10% of all TP values are >51 ug/L but their associated Chla values are >25 ug/L and the TSI score for the lake indicates eutrophic (32-46) or hypereutrophic (>47) conditions	
		Or	
Reservoirs		More than 10% of all TP values are >51 ug/L with associated Chla values <2ug/L, but the TSI score for the lake indicates eutrophic (32-46) or hypereutrophic (>47) conditions	
		Or	
		More than 10% of all TP values are >51 ug/L with associated Chla values >2ug/L	
Drinking Water Use Support – Lakes and Reservoirs			
Information on the application of pesticides to surface drinking water reservoirs	Reservoirs or lakes that serve as source water for public water supplies that received pesticide (algaecide) application permits for algae were classified as not supporting because additional treatment by the public water supply was required to prevent taste and odor problems.		

Other Assessments – Lakes and Reservoirs		
Indiana Trophic State Index (TSI)	Nutrients, ammonia, dissolved oxygen, light transmission and light penetration in the water column turbidity, and algae growth were used to determine TSI scores. Trophic scores were used to classify lakes according to their trophic state. Lake trends were also assessed for lakes with two or more trophic scores if at least one of the scores was less than five years old. Trophic scores and lake trends are not used to determine use support status. These assessments are conducted to fulfill Clean Water Act Section 314 reporting requirements for publicly owned lakes and reservoirs.	

Source: IDEM OWQ 2012 Consolidated Assessment and Listing Methodology

Table 11: Individual use support summary for Indiana streams.

Designated Beneficial Uses						
Designated Beneficial Use	Total Size (Miles)	Size Assessed (Miles)	Percent Assessed	Size Fully Supporting (Miles)	Size Not Supporting (Miles)	Size Not Attainable (Miles)
Full Body Contact (Recreational Use)	42,411	20,804	49%	4,776	16,027	0
Human Health and Wildlife (Fishable Use)	42,331	5,866	14%	1,213	4,653	0
Public Water Supply	117	1	1%	0	1	0
Warm Water Aquatic Life (Aquatic Life Use)	42,320	24,232	57%	17,461	6,771	31

Table 12: Summary of national and state causes impairing Indiana streams.

Causes of Impairment	Total Size (miles)	
Pathogens		
Escherichia coli	16,062	
Oxygen Depletion		
Oxygen, Dissolved	1,686	
Flow Alterations		
Low flow alterations	33	
Habitat alterations (Including Wetlands)		
Physical substrate habitat alterations	75	
Thermal Impacts		
Temperature, water	96	
Nutrients (Macronutrients/Growth Factor	rs)	
Nutrient/Eutrophication Biological Indicators	1,384	
Organic Enrichment (Sewage) Biological Indicators	33	
Toxic Inorganics		
Ammonia (Un-ionized)	63	
Chloride	174	
Cyanide (as free cyanide)	138	
Sulfates	130	
Toxic Organics		
Dioxin (including 2,3,7,8-TCDD)	364	
Hexachlorocyclohexane (mixture)	56	
Polycyclic Aromatic Hydrocarbons (PAHs) (Aquatic Ecosystems)	27	
PCB (Fish Tissue)	4,175	
PCB (Water)	364	
Metals		
Mercury (Fish Tissue)	2,094	
Mercury (Water)	257	

Pesticides			
Atrazine	7		
pH/Acidity/Caustic Comditions			
pH	136		
Sedimentation	Sedimentation		
Sedimentation/Siltation 95			
Oil and Grease			
Oil and Grease	27		
Algae			
Chlorophyll-a 99			
Biological Integrity (Bioassessments)			
Impaired Biotic Communities	4,649		

Table 13: Summary of national and state sources impairing Indiana streams.

Sources of Impairment	Total Size (miles)	
Agriculture – Animal Feeding/Handling Operations (Nonpoint Source – Not Regulated)		
Animal Feeding Operations (NPS)	6,539	
Managed Pasture Grazing	42	
Permitted Runoff from Confined Animal Feeding Operations (CAFOs)	1,529	
Agriculture	948	
Livestock (Grazing or Feeding Operations)	4,032	
Unrestricted Cattle Access	481	
Agriculture – Crop Production		
Crop Production with Subsurface Drainage	2,134	
Crop Production (Crop Land or Dry Land)	96	
Construction		
Site Clearance (Land Development or Redevelopment)	33	
Ground Water Loadings		
Contaminated Ground Water	13	

Habitat Alterations (Not Directly Related to Hydromodification)		
Impacts from Hydrostructure Flow Regulation/modification	472	
Loss of Riparian Habitat	1,152	
Streambank Modifications/destabilization	440	
Upstream Impoundments (e.g., Pl-566 NRCS Structures)	10	
Hydromodification		
Channelization	197	
Dam Construction (Other than Upstream Flood Control Projects)	14	
Industrial Permitted Discharge		
Industrial Point Source Discharge	247	
RCRA Hazardous Waste Sites	3	
Wet Weather Discharges (Point Source and Combination of Stormwater, SSO or CSO)	27	
Land Application Waste Sites		
Illegal Dumps or Other Inappropriate Waste Disposal	381	
On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)	1,029	
Legacy/Historical Pollutants		
Acid Mine Drainage	167	
Contaminated Sediments	326	
Historic Bottom Deposits (Not Sediment)	65	
Impacts from Abandoned Mine Lands (Inactive)	9	
Municipal Permitted Discharges (Direct and Indirect)		
Combined Sewer Overflows	1,334	
Municipal Point Source Discharges	1,696	
Package Plant or Other Permitted Small Flows Discharges	1,921	
Sanitary Sewer Overflows (Collection System Failures)	13	
Stormwater Permitted Discharges (Direct and Indirect)		
Unspecified Urban Stormwater	832	

Natural Sources		
Waterfowl	2,490	
Wildlife Other than Waterfowl	2,490	
Upstream/Downstream Source	87	
Natural Sources	526	
Resource Extraction		
Dredge Mining	49	
Reclamation of Inactive Mining	127	
Spills and Unpermitted Dischar	ges	
Sewage Discharges in Unsewered Areas	4,574	
Urban-related Runoff/Stormwater (Other than R	egulated Discharges)	
Golf Courses	10	
Highways, Roads, Bridges, Infrastructure (New Construction)	2	
Post-development Erosion and Sedimentation	3	
Wastes from Pets	192	
Impervious Surface/Parking Lot Runoff	532	
Rural (Residential Areas)	10	
Urban Runoff/Storm Sewers	188	
Other Sources		
Source Unknown	6,662	
Non-Point Source 11,687		

Table 14: Individual use support summary for Indiana's Lake Michigan shoreline.

Designated Beneficial Uses						
Designated Beneficial Use	Total Size (Miles)	Size Assessed (Miles)	Percent Assessed	Size Fully Supporting (Miles)	Size Not Supporting (Miles)	Size Not Attainable (Miles)
Full Body Contact (Recreational Use)	67	67	100%	5	62	0
Human Health and Wildlife (Fishable Use)	67	67	100%	0	67	0
Public Water Supply	35	35	100%	35	0	0
Warm Water Aquatic Life (Aquatic Life Use)	67	67	100%	62	5	0

Table 15: Summary of national and state causes impairing Indiana's Lake Michigan shoreline.

Causes of Impairment	Total Size (Miles)		
Pathogens			
Escherichia coli	62		
Toxic Inorganics			
Cyanide (as free cyanide)	5		
Toxic Organics			
PCB (Fish Tissue)	67		
Metals			
Mercury (Fish Tissue)	67		

Table 16: Summary of National and State Sources Impairing Great Lakes Shoreline.

Sources of Impairment	Total Size (Miles)		
Land Application Waste Sites			
On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)	22		
Municipal Permitted Discharges (Direct and Indirect)			
Illicit Connections/Hook-ups to Storm Sewers	22		
Other Sources			
Source Unknown	67		
Non-Point Source	6		

Table 17: Individual use support summary for Lake Michigan.

Designated Beneficial Uses						
Designated Beneficial Use	Total Size (Acres)	Size Assessed (Acres)	Percent Assessed	Size Fully Supporting (Acres)	Size Not Supporting (Acres)	Size Not Attainable (Acres)
Aquatic life use	-	-	-	-	-	-
Fishable uses	154,176	154,176	100%	0	154,176	0
Drinking water supply	-	-	-	-	-	-
Recreational use (human health)	-	-	-	-	-	-

Table 18: Summary of national and state causes impairing Lake Michigan.

Causes of Impairment	Total Size (Acres)	
Bioaccumulative Chemicals of Concern		
PCBs (Fish Tissue)	154,176	
Mercury (Fish Tissue)	154,176	

Table 19: Summary of national and state sources impairing Lake Michigan.

Sources of Impairment	Total Size (Acres)
Source Unknown (Applied to Fish Tissue Impairments)	154,176

Source: IDEM 305(b) assessment database

Table 20: Individual use support summary for Indiana lakes.

Designated Beneficial Uses						
Designated Beneficial Use	Total Size (Acres)	Size Assessed (Acres)	Percent Assessed	Size Fully Supporting (Acres)	Size Not Supporting (Acres)	Size Not Attainable (Acres)
Full Body Contact (Recreational Use)	122,303	31,805	26%	23,799	8,006	0
Human Health and Wildlife (Fishable Use)	122,303	66,247	54%	7,820	58,427	0
Public Water Supply Supply	29,541	16,615	56%	230	16,385	0
Warm Water Aquatic Life (Aquatic Life Use)	122,303	10,315	8%	3,690	6,625	0

Table 21: Summary of national and state causes impairing lakes and reservoirs.

Causes of Impairment	Total Size (Acres)		
Pathogens			
Escherichia coli	983		
Thermal Impacts			
Temperature, water	1,556		
Nutrients (Macronutrients/Growth F	'actors)		
Phosphorus (Total)	7,023		
Toxic Organics			
PCB (Fish Tissue)	187,257		
Metals			
Mercury (Fish Tissue)	193,483		
Mineralization			
Taste and Odor	16,385		
pH/Acidity/Caustic Conditions	S		
pH	105		
Algae			
Chlorophyll-a	16,385		
Other Causes			
Cause Unknown	6,520		

Table 22: Summary of national and state sources impairing lakes and reservoirs.

Sources of Impairment	Total Size (Acres)		
Agriculture – Animal Feeding Operations (Nonpoint Source – Not Regulated)			
Agriculture	30		
Industrial Permitted Discharg	ges		
Industrial Point Source Discharge	1,556		
Legacy/Historical Pollutants			
Acid Mine Drainage	105		
Municipal Permitted Discharges (Direct and Indirect)			
Combined Sewer Overflows	30		
Urban-related Runoff/Stormwater (Other than I	Regulated Discharges)		
Impervious Surface/Parking Lot Runoff	30		
Other Sources			
Source Unknown	59,997		
Nonpoint Source	7,054		

Table 23: Lake classification scheme for Indiana.

Trophic state		TSI score
g	Oligotrophic	Less than 15 points on the Indiana TSI scale
phicatio	Mesotrophic	16-31 TSI points
onthe St	Eutrophic	32-46 TSI points
Increa ging	Hypereutrophic	Greater than 47 TSI points
I	Dystrophic	Lakes with little plant growth despite the presence of nutrients; usually due to high humic conditions

Table 24: Trophic status of lakes assessed 2005-2012.

Trophic Status	Number of Lakes	Total Size (Acres)
Oligotrophic	77	13,629
Mesotrophic	186	64,681
Eutrophic	100	16,378
Hypereutrophic	36	3,058
Dystrophic	0	0
Unknown	5	193

Table 25 Trends in the trophic status of lakes assessed 2005-2012.

Trend	Number of Lakes	Total Size (Acres)
Improving	6	3,489
Stable	13	6,840
Fluctuating	35	12,672
Degrading	3	469

Table 26: General wetland information.

Statistic	Amount
Total surface area of the state of Indiana	23,310,000 acres
Estimate of wetland acreage in Indiana circa 1700	5,600,000 acres
Wetland acreage in Indiana circa 1986 (National Wetland Inventory)	813,000 acres
Percent of surface area of Indiana covered by wetlands circa 1700	24.1%
Percent of surface area of Indiana covered by wetlands circa 1986	3.5%
Percent of total area of wetlands that are wholly or partially contained within managed lands (state, local, federal and private areas)	14%
Percent of Indiana's total wetlands that are 0.25 acres or less in size	11.6%
Percent of Indiana's total wetlands that are 0.50 acres or less in size	29.5%
Percent of Indiana's total wetlands that are 1.00 acres or less in size	46.9%
Percent of Indiana's total wetlands that are 5.00 acres or less in size	80.2%

Table 27: Type and extent of Indiana's wetlands.

Wetland type (Cowardin classification)	Historical Extent (Acres)	Extent as of mid-1980s (Acres)
Palustrine scrub/shrub (PSS)	Unknown	42,000
Palustrine forested (PFO)	Unknown	504,000
Palustrine emergent (PEMB)	Unknown	55,000
Palustrine emergent seasonally flooded (PEMC)	Unknown	68,000
Palustrine emergent semi-permanently flooded (PEMF)	Unknown	21,000
Palustrine open water (POW)	Unknown	99,000
Lacustrine limnetic open water (L10W)	Unknown	141,000
Riverine (R)	Unknown	53,000
Total wetland resources	5,600,000	813,000

Source: Rolley, 1991

Table 28: Calls, spills and fish kills reported from 1998 to 2012.

Year	Calls	Spills	Fish Kills
1998	2,649	1,393	28
1999	2,507	1,246	41
2000	2,930	1,491	43
2001	3,093	1,591	51
2002	3,043	1,666	55
2003	3,026	1,551	30
2004	2,829	1,406	37
2005	3,319	1,271	40
2006	3,319	1,368	31
2007	2,852	1,354	36
2008	3,250	1,588	39
2009	2,889	1,226	39
2010	2,411	1,035	47
2011	2,160	This information not included in new tracking system	10

Source: IDEM ULCERS database

Table 29: Major sources of ground water contamination.

Contaminant Source	Highest Priority	Risk Factors*	Type of Contaminant**							
Agricultural Activities										
Agricultural chemical facilities		A,C,H,I	5							
Commercial fertilizer applications	X	A, C, D, E	5							
Confined animal feeding operations	X	A, D, E	5, 9							
Farmstead agricultural mixing and loading procedures										
Irrigation practices		A,C,H,I	1,2,5,8,9							
Animal manure applications	X	A,C,H,I	5, 9							
Pesticide applications		A,C,H,I	1,2							
Storage and Treatment Activities										
Land application		A,C,H,I	5,9							
Domestic and industrial residual applications		A,C,H,I	5,9							
Material stockpiles		A,C,H,I	5,9							
Storage tanks (above ground)		A,C,H,I								
Storage tanks (underground)	X	A, B, C, D, E, F	2, 3, 4							
Surface impoundments										
Waste piles		A,C,H,I	5,9							
Disposal A	Activities									
Deep injection wells										
Landfills (constructed prior to 1989)	X	A, B, C, D, E, F	1, 2, 3, 4, 5, 6, 7, 8, 9							
Permitted landfills (constructed 1989- present)										
Septic systems	X	A, C, D, E, F, G	1, 2, 3, 4, 5, 7, 9							
Shallow (Class V) injection wells	X	A, B, C, D, E, I	1, 2, 3, 4, 5, 7, 9							

Other										
Hazardous waste generators		A								
Hazardous waste sites		A								
Industrial facilities	X	A, B, C, D, E, F	1, 2, 3, 4, 5, 7, 8, 9							
Liquid transport pipelines (including sewer)		A	8							
Materials spills (including during transport)	X	A, B, C, D, E, F	1, 2, 3, 4, 5, 7, 8, 9							
Material transfer operations		A								
Small-scale manufacturing and repair shops		A, I	8							
Mining and mine drainage		A	7,8							
Salt storage (state and nonstate facilities) and road salting	X	A, C, D, E, F	6							
Urban runoff		A, C, H, I	1, 2, 4, 5, 7, 8, 9							

Source: U.S. EPA 2006a; 2007

^{*}Factors considered in selecting the contaminant source: (A) human health and/or environmental risk (toxicity); (B) size of the population at risk; (C) location of source relative to drinking water source; (D) number and/or size of contaminant sources; (E) hydrogeologic sensitivity; (F) documented state findings, other findings; (G) high to very high priority in localized areas, but not over majority of Indiana; (H) geographic distribution/occurrence; and, (I) lack of information.

^{**}Classes of contaminants associated with contamination source: (1) Inorganic pesticides; (2) Organic pesticides; (3) Halogenated solvents; (4) Petroleum compounds; (5) Nitrate; (6) Salinity/brine; (7) Metals; (8) Radionuclides; and, (9) Bacteria, protozoa and viruses.

Table 30: Summary of state ground water protection programs through 2009.

Program or Activity	Status	State Agency/Organization
Active SARA Title III Program	Fully established	IDEM-OLQ ¹
Ambient ground water monitoring program	Under development	IDEM-OWQ
Aquifer sensitivity assessment	Fully established	IDEM-OWQ, IDNR, IGS ² , OISC ³
Aquifer mapping/basin studies	Under development	IDNR, IDEM-OWQ
Aquifer/ hydrogeologic setting characterization	Fully established	IGS, IDEM-OWQ, IDNR
Bulk storage program for agricultural chemicals	Fully established	OISC
Comprehensive data management system	Under development	IDEM-OWQ
Complaint response program for private wells	Fully established	IDEM-OWQ
Confined animal feeding program	Fully established	IDEM-OWQ
Ground water discharge permits for constructed wetlands	Under development	IDEM-OWQ
Ground water Best Management Practices	Under development	OISC*, IDEM-OWQ
Ground water legislation	Fully established	IDEM, IDNR, OISC, ISDH
Ground water classification	Fully established	IDEM-OWQ
Ground water quality standards	Fully established	IDEM-OWQ
Land application of domestic and industrial residuals	Fully established	IDEM-OLQ
Nonpoint source controls	Under development	IDEM-OWQ
Oil and Gas	Fully established	IDNR
Pesticide State Management Plan	Pending	OISC*, IDEM-OWQ, IDNR, IGS
Pollution Prevention Program	Fully established	IDEM-OPPTA ⁴
Reclamation	Fully established	IDNR
Resource Conservation and Recovery Act (RCRA) Primacy	Fully established	IDEM-OLQ
Sensitivity assessment for drinking water/ wellhead protection	Fully established	IGS, IDEM-OWQ

Program or Activity	Status	State Agency/Organization
Spill Monitoring	Fully established	IDEM-OWQ
State Superfund	Fully established	IDEM-OLQ
State RCRA Program incorporating more stringent requirements than RCRA primacy	Fully established	IDEM-OLQ
State septic system regulations	Fully established	ISDH
Underground storage tank installation requirements	Fully established	IDEM-OLQ
Underground Storage Tank Remediation Fund	Fully established	IDEM-OLQ
Underground Storage Tank Permit Program	Fully established	IDEM-OLQ
Underground Injection Control Program	Fully established for Class II wells	IDNR
Well abandonment regulations	Fully established	IDNR
Wellhead Protection Program	Fully established	IDEM-OWQ
Well installation regulations	Fully established	IDNR

^{*}Indicates lead agency involved in enforcement or implementation.

[&]quot;Pending" is used to describe those programs that have a written draft policy; "under development" is used to describe those programs still in the planning stage.

¹OLQ, Office of Land Quality; ²IGS, Indiana Geological Survey; ³OISC, Office of the Indiana State Chemist; ⁴OPPTA, Office of Pollution Prevention and Technical Assistance (IDEM).

Table 31: Indiana ground water protection programs and activities, where they are at in their development and

the agency/agencies responsible for their implementation and/or enforcement.

Analyte Analyte	Number of Samples	Number Below Detection Limit (BDL)	% BDL	Detection Limit	Median	Mean	Min	Max	SD	EPA MCL	EPA SMCL or Recommendation	N > MCL	% > MCL
				A	Alkalinity	and An	ions/Cati	ons					
Alkalinity (mg/L)	437	0	0.00	1	309.83	306.70	36.00	758.00	100.94				
Calcium (mg/L)	614	20	3.26	0.1	80.00	74.60	0.05	310.00	40.64				
Chloride (mg/L)	230	0	0.00	0.25	11.50	30.67	0.85	1000.00	79.54				
Magnesium (mg/L)	614	51	8.31	0.1	27.00	27.78	0.05	190.00	20.03	N/A			
Potassium (mg/L)	614	7	1.14	0.1	1.40	1.88	0.05	22.00	2.15				
Sodium (mg/L)	614	0	0.00	0.1	14.50	46.61	1.20	610.00	78.96		200 (rec)	34	5.54
Sultfate (mg/L)	569	27	4.75	0.25	38.00	72.73	0.13	1286.46	152.67		250	30	5.27

Metals and Minerals													
Antimony (ug/L)	558	544	97.49	0.25	0.13	0.15	0.13	6.10	0.27	6		1	0.18
Arsenic (ug/L)	604	375	62.09	2	1.00	3.66	1.00	70.00	6.66	10		47	7.78
Barium (ug/L)	614	40	6.51	0.5	77.50	125.85	0.25	2500.00	172.02	2000		1	0.16
Boron (ug/L)	614	0	0.00	5	33.00	101.95	0.06	1500.00	190.84				
Bromide (mg/L)	560	451	80.54	0.05	0.03	0.08	0.03	7.70	0.41				
Chromium (ug/L)	604	588	97.35	2	1.00	1.07	1.00	11.00	0.61	100		0	0.00
Copper (ug/L)	612	236	38.56	1	1.40	5.34	0.50	310.00	18.39	1300		0	0.00
Iron (mg/L)	611	180	29.46	0.02	0.49	0.89	0.01	5.90	1.06	0.3		405	66.28
Lead (ug/L)	602	580	96.35	1	0.50	0.57	0.50	9.10	0.50	15		0	0.00
Mercury (mg/L)	602	598	99.34	0.1	0.00	0.00	0.00	0.10	0.01	0.002		0	0.00
Nickel (ug/L)	611	169	27.66	1	1.60	2.29	0.50	20.00	2.77		100	0	0.00
Silicon (mg/L)	568	0	0.00	0.1	7.40	7.58	2.70	18.00	2.22				
Strontium (mg/L)	615	55	8.94	0.005	0.25	128.99	0.00	18000.0 0	1092.42		4 (rec)	67	10.89
Zinc (ug/L)	613	106	17.29	4	12.00	45.31	2.00	2700.00	150.06		5000	1	0.16
		,	•	,	Nitrog	en, Nitra	te-Nitrit	e			,	,	,
Nitrogen, Nitrate-Nitrite (mg/L)	556	295	53.06	0.01	0.01	1.07	0.01	23.22	3.17	10		19	3.42

	Pesticides and Breakdown Products												
Acetochlor ESA (ug/L)	397	376	94.71	0.1	0.05	0.07	0.05	1.60	0.13				
Acetochlor OA (ug/L)	397	390	98.24	0.1	0.05	0.05	0.05	0.40	0.03				
Alachlor ESA (ug/L)	397	341	85.89	0.1	0.05	0.24	0.05	7.70	0.83				
Alachlor OA (ug/L)	397	379	95.47	0.1	0.05	0.06	0.05	0.50	0.04				
Atrazine (ug/L)	592	585	98.82	0.1	0.05	0.05	0.05	1.60	0.07	3		0	0.00
Desethylatrazine (ug/L)	591	586	99.15	0.1 and 1	0.05	0.22	0.05	1.10	0.22				
Desisopropylatra zine (ug/L)	591	590	99.83	0.1 and 1	0.05	0.22	0.05	0.50	0.22				
Metolochlor (ug/L)	592	591	99.83	0.1	0.05	0.05	0.05	0.30	0.01				
Metolochlor ESA (ug/L)	397	338	85.14	0.1	0.05	0.22	0.05	8.10	0.80				
Metolochlor OA (ug/L)	399	374	93.73	0.1	0.05	0.11	0.05	4.60	0.41				

Table 32: Data layer analysis, 2008 to 2010.

D-4- I	Nitrogen, N	itrate-Nitrite	Arsenic			
Data Layer	N N>MCL		N	N>MCL		
Sensitivity						
High	320	16	344	22		
Moderate	72	3	81	7		
Low	120	0	133	16		
Variable	44	0	46	3		
2006 USGS Land Cover						
Cultivated Crops	192	13	208	18		
Deciduous Forest	50	1	56	1		
Developed, High Intensity	5	0	5	0		
Developed, Low Intensity	87	0	95	9		
Developed, Medium Intensity	18	0	19	2		
Developed, Open Space	97	5	102	5		
Evergreen Forest	3	0	3	0		
Hay/Pasture	61	0	70	9		
Herbaceous	35	0	38	4		
Woody Wetlands	8	0	8	0		